



Properties of Solutions and Stability of a Diffusive Wage-Employment System

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Abstract: This paper focuses on the analysis of the properties of solutions and stability of a diffusive wage-employment system. The system is of a diffusive predator-prey type. By choosing appropriate parameters, the global existence, positivity, uniform boundedness and decay estimates of solutions of the system can be characterized. The stability of the system can be also justified.

Keywords: *wage-employment system; global existence; positivity; predator-prey; stability.*

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1 Introduction

Goodwin [1] has constructed a model of the dynamic relationship between wage and employment. The model incorporates three behaviors of economic systems (the market is in a stable equilibrium, the growth is cyclical and its equilibrium is affected by past changes, the economic relations resemble white noise and the economic motion is random [2]). Goodwin's model is analogous to the Lotka-Volterra predator-prey model, the wage and the employment correspond to the predator and the prey, respectively. The model forms a cyclical pattern. When the employment is at high level, the bargaining power of the employed workers drives up the wages, and so shrinks profits. But when the profits diminish, fewer workers are hired and the employment will decrease leading to the increment of the profits. The more profits, the more workers are hired leading to the increment of the employment.

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